

Appendix E: Adams County Detention Facility Case Study: NIST BLCC Comparative Economic Analysis

* N I S T B L C C: COMPARATIVE ECONOMIC ANALYSIS (ver. 4.4-97) *

Project: Adams County Detention Facility in Brighton, Colorado
Basecase: Brighton-Gas Water Heating System—No Solar
Alternative: Brighton-Parabolic Trough Solar Water Heating System with Gas Backup

Principal Study Parameters

Analysis Type:	Federal Analysis—Energy Conservation Projects
Study Period:	25.00 Years (APR 1987 through MAR 2012)
Discount Rate:	3.4% Real (exclusive of general inflation)
Basecase LCC File:	ACDFNOSO.LCC
Alternative LCC File:	ACDFSOLR.LCC

Comparison of Present-Value Costs

	Basecase: Brighton-No Sol	Alternative: Brighton- with Solar	Savings from Alt.
Initial Investment item(s):			
Capital Requirements as of Service Date	\$0	\$178,400	-\$178,400
Subtotal	\$0	\$178,400	-\$178,400
Future Cost Items:			
Annual and Other Recurring Costs	\$111,794	\$45,986	\$65,808
Energy-related Costs	\$353,493	\$212,096	\$141,397
Subtotal	\$465,287	\$258,082	\$207,205
Total Present Value of Life-Cycle Cost	\$465,287	\$436,482	\$28,805
(without state buydown)	\$465,287	\$476,482	-\$11,195
(with subsidy, but adjusted to reflect actual natural gas prices for 1987–1997)	\$401,851	\$394,114	\$7,737

Net Savings from Alternative ‘Brighton-with Solar’ compared to Basecase ‘Brighton-No Solar’

Net Savings = P.V. of Noninvestment Savings	\$207,205
- Increased Total Investment	\$178,400
Net Savings:	\$28,805

Note: the SIR and AIRR computations include differential initial costs, capital replacement costs, and residual value (if any) as investment costs, per NIST Handbook 135 (Federal and MILCON analyses only).

Savings-to-Investment Ratio (SIR) For Alternative ‘Brighton-with Solar’ compared to Base Case ‘Brighton-No Solar’

$$\text{SIR} = \frac{\text{P.V. of non-investment savings}}{\text{Increased total investment}} = 1.16$$

ADJUSTED INTERNAL RATE OF RETURN (AIRR) for Alternative ‘Brighton-with Solar’ compared to Base Case ‘Brighton-no Solar’ (Reinvestment Rate = 3.40%; Study Period = 25 years)

$$\text{AIRR} = 4.02\%$$

Estimated Years to Payback:

Simple Payback occurs in year 17;
Discounted Payback occurs in year 22

Energy Type	Units	ENERGY SAVINGS SUMMARY			Life-Cycle Savings
		Average Annual Consumption			
		Basecase	Alternative	Savings	
Natural Gas	MBtu	5,000.0	3,000.0	2,000.0	50,000.0

EMISSIONS REDUCTION SUMMARY				
Energy Type	Average Annual Emissions			Life-Cycle Savings
	Basecase	Alternative	Savings	
Natural Gas:				
CO ₂ (Mg):	264.1	158.4	105.6	2,640.7
SO ₂ (Kg):	1.0	0.6	0.4	10.5
NO _x (Kg):	205.8	123.4	82.3	2,057.5
Total:				
CO ₂ (Mg):	264.1	158.4	105.6	2,640.7
SO ₂ (Kg):	1.0	0.6	0.4	10.5
NO _x (Kg):	205.8	123.4	82.3	2,057.5

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